Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

05-ESD-0056

MAY 19 2005

Mr. Ron Kreizenbeck
U.S. Environmental Protection Agency
Region 10, RA-140
1200 Sixth Avenue
Seattle, Washington 98101

Dear Mr. Kreizenbeck:

TOXIC SUBSTANCES CONTROL ACT APPLICATION FOR RISK-BASED DISPOSAL APPROVAL FOR TREATMENT OF POLYCHLORINATED BIPHENYLS (PCB) FROM THE HANFORD K-BASINS NORTH LOADOUT PIT IN T PLANT

The U.S. Department of Energy, Richland Operations Office (RL) requests a risk-based disposal approval (RBDA) to allow processing of K-Basins sludge and K-Basins sand filter media at the Hanford T Plant. The sludge is a PCB remediation waste from the K-Basins North Loadout Pit. An RBDA is required since the sludge is a multiphasic waste undergoing treatment into a non-liquid form. This treatment is specifically prohibited by 40 CFR 761.50(2). The prescribed disposal method for liquid PCB remediation waste is thermal treatment or decontamination; however, due to the radioactive components in the sludge, it cannot be thermally treated. Therefore, RL plans to solidify the sludge and associated free-standing water to meet disposal criteria. The enclosed RBDA requested according to 40 CFR 761.61(c), requests approval to solidify the PCB remediation waste. A response to this request by May 31, 2005, would be appreciated.

If you have questions, please contact me or your staff may contact please contact Doug S. Shoop, Assistant Manager for Safety and Engineering, on (509) 376-0108.

Sincerely,

Keith A. Klein
Manager

ESD:ACM

Enclosure

cc w/encl:
D. Bartus, EPA
N. Ceto, EPA
R. H. Gurske, FHI
S. Harris, CTUIR
J. E. Hyatt, FHI
R. Jim, YN
A. L. Prignano, FHI
P. Sobotta, NPT
M. A. Wilson, Ecology
Environmental Portal, LMSI

HNF-25697
Revision 0

Risk-Based Disposal Approval for PCBs in North Loadout Pit Sludge

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management
Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

HNF-25697
Revision 0

Risk-Based Disposal Approval for PCBs in North Loadout Pit Sludge

A. L. Prignano
Fluor Hanford, Inc.

Date Published
April 2005

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Fluor Hanford
P.O. Box 1000
Richland, Washington

J. D. Aardal 4/21/2005
Release Approval Date

Approved for Public Release;
Further Dissemination Unlimited

CONTENTS

TABLE

TERMS

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
CWC	Central Waste Complex
DOE-RL	U.S. Department of Energy, Richland Operations Office
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
g/cm^3	grams per cubic centimeter
HEPA	high-efficiency particulate air
KE	K East
LDC	Large Diameter Containers
LWPF	Liquid Waste Processing Facility
mrem/hr	millirem per hour
NLOP	North Loadout Pit
PCB	polychlorinated biphenyl
ppb	parts per billion
ppm	parts per million
RBDA	risk-based disposal approval
RCRA	*Resource Conservation and Recovery Act of 1976*
TRU	transuranic
TSCA	*Toxic Substances Control Act of 1976*
WAC	waste acceptance criteria
WIPP	Waste Isolation Pilot Plant
°C	degrees Celsius
°F	degrees Fahrenheit

METRIC CONVERSION CHART

Into metric units | Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1993, Professional Publications, Inc., Belmont, California.

RISK-BASED DISPOSAL APPROVAL FOR PCBs IN NORTH LOADOUT PIT SLUDGE

1.0 INTRODUCTION

This risk-based disposal approval (RBDA) specifies how *Toxic Substances Control Act* (TSCA) *of 1976* requirements contained in Title 40, *Code of Federal Regulations* (CFR), Part 761 will be complied with for the North Loadout Pit (NLOP) sludge to be treated at the T Plant. The NLOP sludge is part of Hanford K Basins sludge. The U.S. Department of Energy, Richland Operations Office (DOE-RL) is requesting this approval to address treatment of PCBs in the K Basins sludge via solidification (grouting) as opposed to thermal treatment or decontamination.

Polychlorinated biphenyls (PCBs) are one of the contaminants present in the K Basins sludge. The source of the PCBs and the date when they were introduced into the sludge are unknown. There are no known authorized uses of PCBs in the basins. It is assumed that the PCBs came to be present in the sludge as a result of a spill or release of material containing PCBs at an unknown concentration. Based on this information, the sludge is assumed to meet the definition of a PCB remediation waste.[1]

The K Basin waste is a multiphasic waste as described in 40 CFR 761.1(b)(4); it has both a solid and liquid phase. The U.S. Environmental Protection Agency (EPA) guidance explains that when disposing of multiphasic waste, both phases shall be managed for disposal in a manner that assumes both phases contain PCBs. For example, even though PCBs have not been found in the liquid phase of the sludge using test methods with a detection limit of 0.5 parts per billion (ppb), the liquid phase is still treated as if it contains PCBs. The prescribed disposal method for liquid PCB remediation waste is thermal treatment or decontamination. However, DOE-RL plans to solidify the sludge and free-standing water associated with the sludge to meet the Central Waste Complex (CWC) and Waste Isolation Pilot Plant (WIPP) waste acceptance criteria (WAC). Treatment of the sludge might result in a waste form that meets criteria for disposal at an onsite facility [e.g., Environmental Restoration Disposal Facility (ERDF)]. If the waste form meets the onsite facility criteria, then the waste will be disposed at that onsite facility. In addition, residual waste remaining in the Large Diameter Containers (LDCs) used to transport the sludge will be solidified within the LDCs. Grouting of the LDCs is required to address void spaces to meet disposal requirements in a landfill.

This RBDA demonstrates that the risks associated with managing the NLOP sludge for disposal by grouting are within acceptable levels. The demonstration that the PCBs do not present an unreasonable risk is based on the following points:

---

[1] 40 CFR 761.3 of the TSCA regulations defines PCB remediation waste as "waste containing PCBs as a result of a spill, release, or other unauthorized disposal, at the following concentrations: Materials disposed of prior to April 18, 1978, that are currently at concentrations of ≥50 ppm PCBs, regardless of the concentration of the original spill; materials which are currently at any volume or concentration where the original source was ≥500 ppm PCB beginning on April 18, 1978, or ≥50 ppm beginning on July 2, 1979; and materials which are currently at any concentration if the PCBs are from a source not authorized for use under this part. PCB remediation waste means soil, rags, and any other debris generated as a result of any PCB spill cleanup, including but not limited to: (1) Environmental media containing PCBs, such as soil and gravel; dredged materials, such as sediments, settled sediment fines, and aqueous decantate from sediment; (2) Sewage sludge containing ≥50 ppm PCBs and not in use according to 761.20(a)(4); PCB sewage sludge; commercial or industrial sludge contaminated as a result of a spill of PCBs including sludges located in or removed from any pollution control device; aqueous decantate from an industrial sludge; (3) Buildings and other man-made structures, such as concrete or wood floors or walls contaminated from a leaking PCB or PCB-Contaminated transformer, porous surfaces and non porous surfaces."

- The concentration and total mass of PCBs in the K Basins sludge are low,
- The treated sludge will require safe storage and long-term isolation because of the highly radioactive contaminants, regardless of residual PCB contamination,
- The risk of release of PCBs to the environment is insignificant,
- There are no facilities in the country that are allowed to thermally treat PCB waste containing transuranic (TRU) waste,
- Due to the radioactive nature of the sludge, the safety risks to workers and the public associated with decontamination or thermal treatment are higher than for solidification.

Use of the liquid portion of the multiphasic PCB waste as part of the solidification process is being requested. As additional water must be added to the sludge to complete the solidification process, removal of the aqueous phase would result in additional exposure and high dose rates for workers and increased potential for spread of radioactive contamination. The aqueous portion is less than 0.5 ppb PCB and is used for shielding and contamination control. At this PCB concentration, the aqueous portion of the waste, if separated from the sludge, would be unrestricted under TSCA with regard to disposal or reuse. A one-liter sample of the waste produced 360 millirem per hour (mrem/hr) with the water shielding. Removal of the water would increase the radiation exposure significantly.

2.0 CONCENTRATION AND QUANTITY OF PCBS

PCBs have been detected in the K Basins sludge in several sampling events. Seven samples collected at different locations on the main floor and in the pits of the K East (KE) Basin in late 1995 were analyzed for semi-volatile organic compounds. PCBs were detected in three of these samples, which lead to further evaluation of K Basin sludge for PCBs.

The nominal volume of the as-settled NLOP sludge is 6.30 cubic meters (m^3). The average water content is 87 volume percent. The nominal PCB concentration is 9.41×10^{-5} grams per cubic centimeter (g/cm^3) on a settled solids basis (HNF-SD-SNF-TI-009, Revision 4). The calculated nominal dry weight analysis is 240 parts per million (ppm) PCB [i.e. (9.41×10^{-5} g PCB/cm^3 -as-settled sludge)/(0.397 g dry solids/cm^3 -as-settled sludge)].

3.0 MANAGEMENT OF PCB WASTES PRIOR TO TREATMENT

At K Basins, the sludge will be placed in stainless steel LDCs designed for storage of radioactive waste and then transported to T Plant. Each LDC will be contained within a shipping cask. LDCs are not intended to be reused for other sludge shipments. It is anticipated that about five LDCs will be needed to transport the sludge.

The LDCs will either be moved directly from the transport trailer to the sludge treatment area on the canyon deck floor or will be placed in storage within a cell in T Plant and later lifted out and placed on the canyon deck floor for treatment. The LDC PCB containers will be stored in secondary containment in the sludge treatment area. While in the sludge treatment area, the LDC will be placed in an overpack to keep radiation exposure As Low As Reasonably Achievable (ALARA).

4.0 SLUDGE TREATMENT

This material will be transferred as slurry from K Basin to T Plant using an LDC and treated using the NLOP Sludge Grouting System. T Plant is a *Resource Conservation and Recovery Act* (RCRA) *of 1976* permitted storage facility. The NLOP Sludge Grouting System's function is to process the 6.3 m^3 of NLOP sludge waste for ultimate waste packaging in 208-liter drums with a cement grout. The process is to transfer the sludge from the LDC as diluted sludge to a 1,136-liter buffer tank, agitate the sludge to a consistent suspended solids fraction and transfer to 208-liter drums, add grout formers, and mix to the prepared grout. The grout addition and mixing operation is designed to eliminate free-water in the cured grout matrix.

4.1 SLUDGE TREATMENT SYSTEM

When the LDC is first placed on the canyon floor for treatment, the LDC is placed in an overpack to keep exposure ALARA. Scaffolding is erected around and over the LDC to allow operations personnel access to the top of the LDC. Shielding is placed over the top of the LDC to keep exposure ALARA. Operations personnel access the shielded LDC and remove multiple cleanout port caps to allow use of system portable hoses, suction wand, water spray wand for transferring the sludge, and camera.

The sludge is fluidized with water within the LDC and then transferred to the grouting system buffer tank utilizing a suction wand to vacuum transfer the slurry. The wands are utilized to pump solution from the buffer tank/grouting system back into the LDC to fluidize the compacted sludge layer and improve the pumpability of the LDC solids. A camera can also be inserted to verify the removal of sludge from an LDC. The transfer system also uses clean water to rinse the suction wand prior to removal and to add water to the LDC to improve solids fluidization, if necessary. The design incorporates gamma dose measurements of the sludge at the buffer tank using an in-line gamma monitor mounted on the system. The amount of sludge added to each drum is determined based on a correlation between the gamma monitor reading and the volume of sludge with that reading that, when grouted, would result in a product with a contact dose rate of ≤200 mrem/hr.

To reduce radiation dose to workers during processing, the radiation shielding enclosures are used during sludge grout processing. Once in the enclosure, the empty drum is transferred along the conveyor to a grout blending station. A waste grout mixer is lowered onto the drum and a cover plate is used to seal the top of the drum to prevent sludge from splashing outside of the drum during loading and blending. A specified volume of slurry is transferred into the drum. Water is added to the sludge followed by grout formers (cement and bentonite clay) and the mixture blended. The disposable agitator is disconnected from the mixer and solidifies within the drum as the mixture begins to harden. The drum is conveyed to a lidding area where a vented drum lid is placed on it. The drum is transferred out of the enclosure and a drum filter is installed into the port on top of the drum. The container is then radiologically surveyed and placed onto a pallet for storage prior to transfer.

4.2 LARGE DIAMETER CONTAINERS

In addition, this RBDA allows treatment of the LDC containers prior to disposal. The LDCs are stainless steel cylinders with nominal outside diameter of 1.5 meters and a maximum height of 3 meters. Each LDC is loaded with approximately 2 m^3 of sludge. About five LDCs will be used to transfer the NLOP sludge. The LDCs will be emptied to the extent practicable. However, it is expected that approximately 180 kilograms of sludge could remain in each LDC after transfer of the contents for processing. Internal filter assemblies, consisting of fifty-five, 5-micron cartridge filters, trap solids within the LDC. The majority of residual sludge is expected to be located in these filters. Processing of the discarded LDCs consists of grouting the void space to meet disposal requirements. This processing will take place at T Plant or in the 200 Area near the intended disposal unit.

4.3 SAND FILTER

In addition, it is proposed to use this same process to stabilitize approximately 2.5 m^3 of sand from a sand filter at the NLOP facility. The sand filter was used in the water cleaning process that generated the NLOP sludge. The sand filter was added to the water cleaning system for the KE Basin in 1978. KE Basin water containing finely divided solids was collected by surface skimmers and pumped to the sand filter. Filtrate from the sand filter was further treated in ion exchange modules. The suspended solids accumulated in the sand until the pressure drop across the filter reached established operating limits, at which time the sand filter was backwashed. The backwash was collected in the NLOP, where the solids were allowed to settle as sludge.

Following a final backwash, the sand will be removed from the sand filter and sent to T Plant for solidification. Given the direct relationship between the sand filter and the NLOP sludge, the type and ratio of contaminants in the sand filter are expected to be similar to those in the NLOP sludge although at lower concentrations. Most contaminants were backwashed from the filter on a regular basis, and only a small fraction of the mass in the sand filter is contaminated particulate.

The sand will be managed in the same manner as described for the NLOP sludge including use of LDCs for transportation. As the concentration of PCBs in the sand is projected to be significantly lower than that in the NLOP sludge, any risk associated with the sand will be significantly lower as well.

5.0 MANAGEMENT OF PCB WASTES DURING TREATMENT

The configuration of the LDC in the overpack precludes a visual examination of the LDC for leaks. Leak detection of the NLOP Sludge Grouting System will be via remote sensing leak detector probes. A conductivity probe will be placed in the space between the LDC and the overpack. This space is approximately five centimeters (two inches) wide. The LDC overpack is 3.2 meters deep; the probe will be placed approximately 1.3 cm from the bottom of the overpack. At this level the probe will detect a leak of approximately 25 liters. For the other enclosures, the leak detector probe will typically be placed at 1.3 cm above the bottom of the secondary containment as well. At this level the probe detects leaks of approximately 0.2 liters in the LDC transfer pump enclosure; 38 liters in the buffer tank enclosure; and 48 liters in the drum loading/mixer enclosure.

If a leak is detected via the remote sensing probe alarm, it will be verified remotely (e.g., remote camera) if possible. If it is not possible to verify remotely, then the container will be managed as if it has leaked. If a leak has occurred steps will be taken to ensure that the PCB waste in the inner container is contained as soon as practicable. Options to contain the PCB waste may include repairing the inner container, repackaging the waste, and/or expediting treatment. In addition, the leaked material within the secondary containment might be absorbed or pumped into a separate container and managed as PCB waste.

6.0 MANAGEMENT OF TREATED SLUDGE AND RESIDUAL PCBS

The treated sludge is expected to contain residual PCBs. However, the sludge would also be a radioactive waste that would be regulated and managed as either TRU waste or low-level radioactive waste.

Secondary waste generated by this removal action, such as anti-contamination clothing, used LDCs, and other waste that meets or can be treated to meet the WAC for ERDF may be disposed at ERDF or at the Hanford Mixed Waste Trench as on-site environmentally protective management facilities for the debris provided this waste meets the facilities' waste acceptance criteria.

Stabilized sludge drums are expected to assay as TRU and fully meet WIPP WAC. Some material, however, might assay as <100 nanocuries/gram TRU, and thus be ineligible for disposal at WIPP. To ensure that the proposed stabilization process does not generate wastes with no disposal options, the projected characteristics of the waste (non-liquid PCB waste) have been compared to WAC for candidate disposal units (Table 1). The expected waste will be managed as a non-liquid PCB remediation waste. This analysis demonstrates that waste that is not eligible for WIPP disposal is likely to meet the applicable Hanford WAC and be eligible for onsite disposal.

The secondary waste will be managed as a newly generated waste. Any secondary waste contaminated with the sludge will be managed as *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980* waste.

7.0 SYSTEM DISPOSITION AND/OR DECONTAMINATION

After completion of the NLOP sludge grouting process, the system components will either be reused for processing of additional PCB waste, decontaminated with respect to PCBs, or disposed as a TSCA regulated PCB waste. This equipment could also be reused to support other onsite and/or offsite treatment activities for PCB, RCRA, and/or other radioactive waste. Management of the process equipment and containment units will be based on TSCA applicability. Only materials that are reasonably expected to have contacted regulated waste will be dispositioned as TSCA regulated materials. For the TSCA-regulated waste, any decontamination will meet the requirements of 40 CFR 761.79 and disposal will be according to the requirements of 40 CFR 761.50 using self-implementing methods [e.g. 761.61(a) or (b)] whenever possible.

No contamination is expected on the T Plant canyon decks. Therefore, unless a PCB spill or other PCB release contacts the canyon deck, the deck will not require any closure or decontamination activities.

Disposal of PPE and non-liquid cleaning materials will be based on TSCA applicability. Only materials that are reasonably expected to have contacted regulated waste will be disposed according to 40 CFR 761.61(a)(5)(v)(A) as summarized in *Toxic Substances Control Act Polychlorinated Biphenyls Hanford Site Users Guide* (DOE/RL-2001-50, Rev. 1) Section 6.1, "PPE and Non-Liquid Cleaning Materials".

8.0 RISK ASSESSMENT

Engineered and administrative controls (e.g., secondary containment, leak detection, training, and job hazards analyses) are in place at T Plant during NLOP sludge processing to minimize the probability of releases of waste to the environment. Releases of liquid and solid materials will be confined within secondary containment and will be detected and managed as discussed for leaks.

Based on the system configuration, the air pathway is not considered a viable pathway due to controls in place. The 221-T canyon confinement system includes ventilation, filtration, exhaust fans, and a stack. To minimize the possibility of airborne contamination spread, the canyon ventilation exhaust fans maintain a negative differential pressure in the canyon relative to that of the atmosphere and the T Plant pipe, electrical, and operating galleries. The air in the ventilation tunnel is drawn through the canyon ventilation exhaust system. The system consists of four high-efficiency particulate air (HEPA) filter banks. Each bank contains a prefilter, primary HEPA filter, and a secondary HEPA filter. After HEPA filtration, ventilation discharges to the 291-T stack.

The NLOP Sludge Grouting System has additional ventilation controls. The LDC being emptied, the transfer pump containment, the buffer tank containment, and the grout mixer enclosure are connected to portable HEPA exhausters. This system is designed to maintain a minimum of 125 feet per minute capture velocity at any opening from the containments during normal operating conditions. Back flow dampers are equipped on the grout mixing enclosure, the transfer pump containment, and the buffer tank containment to allow air flow to enter the enclosures, but close off if other air flow paths become available.

In addition, a risk assessment was performed to ensure that any airborne PCBs are well within acceptable limits. The risk assessment calculation shows that volatilization of PCBs is insignificant. To allow comparison with the risk assessment performed for the previously approved (EPA 2004) Risk-Based Disposal Approval for Polychlorinated Biphenyls Hanford 200 Area Liquid Waste Processing Facility (LWPF), Arochlor* 1254 was assumed for the calculations. In addition, Arochlor 1254 is considered the most toxic Arochlor mixture.

The calculated maximum total amount PCB in each grouted container, based on total PCBs in the sludge and estimated maximum quantity of sludge per drum for dose considerations, is 1.7 grams. Only PCBs in the aqueous phase are able to volatilize into the atmosphere. PCBs preferentially partition into solid and organic phases over aqueous, therefore, the amount of PCBs available in the aqueous phase is far lower than the total PCB in the container. Assuming all PCBs are due to Arochlor 1254, the concentration of PCBs in the aqueous phase is calculated as 2.3×10^{-4} mg/L. Concrete generates heat during hydration (the chemical process by which cement reacts with water to form a hard stable material), therefore the partial pressure of PCBs at this higher temperature was calculated. A 20°C temperature increase is assumed for the curing process, giving a maximum temperature of approximately 45°C. The partial pressure of PCBs at 45°C calculates as 1.2×10^{-6} mmHg. From the partial pressure, the PCB evaporation rate can be estimated. The PCB evaporation rate is at its maximum during the time period from start of mixing to the completion of the lidding process, approximately one hour later. For this first hour of curing, the drum is assumed to be open top (surface is 57 centimeters diameter), which gives an evaporation rate of 1.7×10^{-8} grams per second, after the first hour, a lid is placed on the drum that has a NucFil® filter which allows an approximately 0.6 centimeter-diameter opening. With the smaller opening, the evaporation rate calculates to 2.1×10^{-12}grams per second.

The PCB evaporation rate previously approved for the 200 Area Effluent Treatment Facility (DOE/RL-2002-02), is 2×10^{-3} grams per second, released continuously. The higher, open top, curing process evaporation rate of 1.7×10^{-8} grams per second is five orders of magnitude smaller than the maximum approved for the 242-A Evaporator. This rate drops an additional four orders of magnitude once the lid is in place. Therefore, it is concluded that the risk due to evaporation of PCBs during the treatment process is insignificant.

9.0 CONCLUSIONS

The DOE is proposing a risk-based approach to managing the PCBs present in the NLOP sludge. The regulations specify that liquid PCB waste be disposed of by thermal methods, such as incineration

---

* Arochlor is a trade name of Monsanto.
Nucfil® is a registered trademark of Nuclear Filter Technology, Inc., Lakewood, Colorado.

(40 CFR 761.60). Since there is no provision for solidification of a liquid or multiphasic waste, an RBDA is required to treat this multiphasic waste into a non-liquid form for disposal.

The concentration and mass of the PCBs in the sludge are low. PCBs remaining in the sludge after treatment will be managed in a protective manner because the treated sludge will be a radioactive waste. Potential risks to workers and the public associated with other types of treatment or disposal prescribed by TSCA regulations (e.g., decontamination or thermal treatment) of PCBs in the K Basins sludge are higher due to the high radioactivity.

Based on this information, it is concluded that the PCBs do not present an unreasonable risk to human health or the environment. The sludge treatment identified is protective of human health and the environment with respect to PCBs. As presented this protectiveness conclusion would also apply to the future management of the treated sludge.

10.0 REFERENCES

BHI-00139, *Environmental Restoration Disposal Facility Waste Acceptance Criteria*, Bechtel Hanford, Inc., Richland, Washington.

DOE/RL-2001-50, *Toxic Substances Control Act Polychlorinated Biphenyls Hanford Site Users Guide*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-2002-02, *Application for Risk-Based Disposal Approval for Polychlorinated Biphenyls, Hanford 200 Area Liquid Waste Processing Facilities*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/WIPP-02-3122, *Contact-Handled Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant*, U.S. Department of Energy, Carlsbad Field Office, Carlsbad, New Mexico.

EPA, 2004, letter dated June 8, 2004, from L. John Iani, Regional Administrator, EPA, to J. Hebdon, DOE-RL, and J. Rasmussen, DOE-ORP, "Approval of the Toxic Substance Control Act (TSCA) Risk-based Disposal Approval (RBDA) Application for Management of Polychlorinated Biphenyl (PCB) Remediation Waste at the 200 Area Liquid Waste Processing Facilities", U.S. Environmental Protection Agency, Region 10, Seattle, WA.

HNF-EP-0063, *Hanford Site Solid Waste Acceptance Criteria*, Fluor Hanford, Inc., Richland, Washington.

HNF-SD-SNF-TI-009, *105-K Basin Material Design Basis Feed Description for Spent Nuclear Fuel Project Facilities, Volume 2, Sludge*, Rev. 4, Fluor Hanford, Richland, Washington.

Table 1. Selected Waste Acceptance Criteria at Candidate Disposal Units.

Waste Acceptance Criteria Components	Waste Isolation Pilot Plant[(1)]	Environmental Restoration Disposal Facility[(2)]	Mixed Waste Trenches [(3)]	Central Waste Complex[(3)] (for storage)
PCB Concentration Levels	As allowed in a chemical waste landfill, 40 CFR 761.75	Nonliquid PCBs at any concentration; Bulk liquids <500 ppm, after stabilization	Prohibited, except as specifically authorized by 40 CFR 761.	Approved for storage of TSCA regulated PCB waste, per 40 CFR 761.65(b)(2)
CERCLA	Allowed	Allowed	Prohibited, except if EPA has specifically approved (e.g., Record of Decision) management of the waste at the Low-Level Burial Grounds.	Allowed
Liquid	Less than 1 percent of the waste volume in a container	Less than 1 percent of the waste volume in a Container	Less than 1 percent of the waste volume in a container	Only if packaged in labpacks or overpacks in quantities less than or equal to 57 liters per outer container.
Radioactivity limits	TRU greater than 100 nCi/g	TRU less than 100 nCi/g; spent nuclear fuel and high-level waste prohibited. Other radionuclides: see Table 2 in BHI-00139, Rev. 4; waste exceeding Cat 3 limit	TRU less than 100 nCi/g; Cat 3 waste by requirements in HNF-EP-0063, Section 3.4.1	Allowed
Package Dose Rate	Less than or equal to 2 mSv/h at the surface	Less than 1 mSv/hr; higher dose rates require advance notice and special handling	Less than 1 mSv/h at 30 centimeters, and less than 2 mSv/h at the surface	Less than 1 mSv/h at 30 cm, and Less than 2 mSv/h at the surface
Packaging	208-liter drums; 322-liter drums; 379-liter drums; all at less than or equal to 453.6 kilograms.	For transportation to ERDF must be meet U.S. Department of Transportation	HNF-EP-0063, Rev. 11, Section 3.5.1	Noncombustible materials; see HNF-EP-0063, Rev. 11, Section 4.5.1
Void Space		No void space; dump and crush required for containers	Containers must be at least 90 percent full	Not applicable
Compatibility	With payload container, packaging materials, shipping container materials, other wastes, repository backfill, and seal and panel closure materials	With liner	With liner	All waste placed in a given outer container shall be chemically compatible
Head Space Gas Sampling	Required	Not required	Not required	Not required

(1) DOE/WIPP-02-3122
(2) BHI-00139, Rev. 4
(3) HNF-EP-0063, Rev. 11

DISTRIBUTION

	MSIN
B. M. Barnes	T3-28
T. M. Crane	T3-28
W. J. Geuther	T3-28
J. E. Hyatt	H8-40
R. E. Johnson	H8-40
P. W. Martin	T4-09
S. L. Metzger	T3-28
A. L. Prignano	H8-40
W. E. Toebe	H8-12
D. J. Watson	X3-28
R. E. Wilkinson	T3-28
R. T. Winward	X3-79